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Rescuing forests from the carbon trap

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A B S T R A C T

As climate policies incentivise forest carbon enhancement, forest ecosystems have been reduced to carbon forestry. As a result, the potential of forests for both the natural world and human beings is being severely compromised. Co-benefits to ecosystems and communities have often been presented as a solution but without much effect. In this paper, we highlight how the current discourse on forest and climate change has become carbon centric, masking the overall resilience building potential of forest ecosystems. We also explore potential ways forward.

1. Introduction

Amidst growing responses to climate change in recent years, no natural ecosystem has received as much global policy attention as the forest. Indeed, forest ecosystems have come on the frontline of efforts to offset carbon emissions. The focus on forests has, however, come at a tremendous cost to the forest itself, as efforts to respond to the crisis of climate change are causing a different kind of crisis for forests. The extraordinary emphasis on this renewable resource is not surprising given that 31% of the world's land surface is forested, with multifaceted links between forests, carbon emissions and storage, and adaptation (Bonan, 2008). However, what emerges as a matter of concern is that in current climate change mitigation strategies, forest ecosystems are projected merely as carbon cultivation farms. In these carbon centric policy framings, the multifaceted social and biological contributions of forest ecosystems to life have gone under-valued, as climate policies seek to incentivise forest carbon enhancement. This topic warrants a full-fledged research, but here we present a commentary to contribute to ongoing practical policy debates.

Multifunctional forest landscapes provide far more than simply carbon sinks (Gustafsson et al., 2012). Forested landscapes are the source of a range of ecosystem services including soil and water conservation, although these services are often taken for granted, with their values going unrecognised. The rich biodiversity found in forests strongly supplements the food and livelihoods needs of forest dependent people, and in many situations, indigenous culture and communities live in harmony with forest biodiversity (Cairns, 2007). About 1.6 billion people depend on forests for their livelihood, employment and income generation (United Nations strategic plan for forests, 2017–2030 (UN, 2016). Furthermore, gender equity goals are supported through access to forest resources and collective forest management activities (FAO, 2018). Clearly, multifunctional forests provide much more diverse ecological benefits than carbon sequestration alone, and often such services are provisioned through complex ecological pathways which defy measurement and accounting. Taken together, these benefits warrant a closer look at the implications of strategies aimed at reducing forests to carbon.

Our commentary is motivated by a concern over the rapidly expanding efforts at climate change mitigation in forests that ignore these crucial ecological and livelihood benefits. The carbon drive in forest policy is particularly critical in low-income countries, where, as FAO, 2015 forest assessment shows, the rate of forest loss is higher (FAO, 2015; Keenan et al., 2015). The reduction of forests to carbon is likely to escalate vulnerability to climate change for forest dependent people, and downstream users of forest ecosystems services across the planet alike. Mitigation activities often claim to promote adaptation, but by failing to monitor and value forest ecosystem services and diversity, they are more likely to cause maladaptation (D'Amato et al., 2011; Pandey et al., 2016). We argue that the debate surrounding the resilience of the planetary system to climate change must refocus to consider all important forest functions. We illustrate our argument through the example of Nepal, where carbon forestry has been transplanted into community forestry, a program wherein local communities have made significant efforts towards restoration of multifunctional

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forest ecosystems. Finally, we suggest some strategies to revisit the current approach towards more integrated management of forests in the context of climate change.

2. Climate actions on global forests

At its core, the importance of forests for climate change is twofold. On the one hand, forest degradation and deforestation contribute over 20% to global greenhouse gas (GHG) emissions (Van der Werf et al., 2009; Solomon et al., 2007). A report by the Food and Agriculture Organization (FAO) suggests an annual loss of approximately 7.6 million hectares of forests from the earth during the period 2010–2015 (FAO, 2015). For these reasons, forest areas have been identified as a key source of greenhouse gases. Alongside the evidence of forest loss as a source of greenhouse gas emissions, forests also have the potential to absorb carbon, thereby reducing GHG emissions. Some studies claim that forests capture about half of carbon emissions from the fossil fuels every year (Pan et al., 2011). Besides carbon sequestration, forests can modulate the land- atmosphere exchange of energy and water vapour (Hesslerová et al., 2013). Given these benefits of forest ecosystems, halving carbon emissions from deforestation and forest degradation could help keep the global temperature rise to 2 °C (Zarin et al., 2016). This latter fact about the forest's potential to reduce emissions and limit the global temperature rise has actually led to a discourse and practice of monoculture carbon forestry and to the proliferation of carbon forest policies, centered around REDD+.

After the Paris climate agreement, the role of forests in mitigating climate change has been given a global boost. Both developed and developing countries are using forest carbon for their Nationally Determined Contributions (NDC) for country-specific measures on climate change mitigation (van der Gaast et al., 2016). For example, by early 2018, 148 developing countries submitted their NDCs, with 97 of them having Land Use Change and Forestry (LULUCF) and 50 countries aiming for emissions reductions through REDD+ activities (UN EOSG and UNFCCC, 2017). Clearly, this shows the extent to which forests are being pushed to mitigate climate change.

However, forest carbon policies appear to ignore the literature revealing that the importance of forests for climate change goes well beyond carbon emissions and sinks. Here we highlight four points. First, carbon and biodiversity benefits do not necessarily go together (Phelps et al., 2012; Maraseni et al., 2016). Rather, promoting carbon can reduce biodiversity, and thus the resilience of the forest ecosystem (Sakschewski et al., 2016). A study shows that extreme drought conditions under changing climate is leading to the collapse of forests (Verbesselt et al., 2016). Similarly, another study shows that anthropogenic increases in temperature and vapour pressure deficit significantly enhanced fuel aridity across western US forests over the past several decades and contributed to 75% more forested area experiencing high fire-season fuel aridity and an average of nine additional days per year of high fire potential (Abatzoglou and Williams, 2016). Moreover, there is plenty of evidence showing that the reduced level of ecological (forested ecosystem) resilience is likely to exacerbate community vulnerability (Adger, 2000). For example, a large number of non-wood and forage species that women have relied upon are on the verge of disappearing, making women more vulnerable (Bhattarai et al., 2015). These losses are significant considering that biodiversity endemic within forest ecosystems has the potential to enhance resilience to the impact of climate change for forest dependent people (Isbell et al., 2015). Carbon forestry is thus likely to not only exacerbate the forest's own vulnerability, but also that of forest dependent people, especially women, children and the elderly in the developing world.

Second, forest contributions to livelihoods are especially crucial for people considered most vulnerable to climate change. Forest ecosystems offer a safety net in times of food scarcity when non-timber forest products like nuts, herbs and berries are integrated as part of livelihood systems. Economically and politically marginalised peoples, most often women, ethnic minorities, elderly and the very poor, already rely on forest ecosystems for livelihood security. For example, women are heavily involved in collecting fuelwood, medicinal plants, other non-wood forest products, and food for family consumption (FAO, 2013). Of 850 million people engaged in collecting fuelwood or producing charcoal, 83% are women (SOFO, 2014).[1] Women are also increasingly involved in forest-based enterprises that not only provides income, but has also enhanced their abilities to work collectively to advance their interests in securing access to natural resources (Shackleton et al., 2011). Moreover, marginalised people who work closely with forest ecosystems have developed rich local knowledge about forest biodiversity which can offer them a unique opportunity to participate meaningfully in public policy processes around forest governance.

Thirdly, putting too much emphasis on carbon sequestration has undermined other forest related programs that have helped improve forest condition and community resilience over the last several decades. For example, community forestry in Nepal has been celebrated for promoting reforestation, more equitable access to resources and for being a model of decentralised forest governance (Pokharel et al., 2007). Yet, Nepal's REDD+ mitigation policy development has paid greater attention to technical aspects of carbon forestry such as developing monitoring, reporting and verification (MRV) mechanisms and technical measures to address the drivers of deforestation and forest degradation (Paudel et al., 2010; Paudel et al., 2015). There has been limited attention to the policy and governance challenges and possible implications for supporting local livelihoods and biodiversity safeguards (Khatri et al., 2018b). Studies of REDD+ at the village level show that the insertion of carbon sequestration goals into community forestry management activities have put more emphasis on conservation and managing forests for monetary benefits at the expense of livelihood needs (Khatri et al., 2018a). This shift in focus has resulted in more restrictive management practices that undermine the principles of meeting the diverse needs of small holder members of the community forest user groups. Moreover, carbon forestry has created new shared interests between the government (who promotes carbon forestry) and community elites who no longer depend on forests for everyday livelihoods needs and capture most of the REDD+ benefits, further marginalising those dependent on forests (Khatri et al., 2018b).

Fourth, forest governance is a crucial arena in which gains for political authority and decentralisation have been achieved but are now potentially threatened by a carbon centric approach to forest management. One of such effects is found in carbon policies leading to recentralization of forest governance (Rahman and Giessen, 2016). The focus on forests as carbon has significant implications for forest governance; here we focus on two main points: the co-optation of oppositional groups through stakeholder engagement, and concerns about recentralisation. Forests have long been the locus of struggles over authority between different levels of government and between forest departments and users (Nightingale and Ojha, 2013; Nightingale, 2017; Ribot, 2006). In Nepal, forestry has led the way in successful models of decentralisation and engagement of villagers in governance. Furthermore, through national and international level networking and organising around forests, powerful advocacy groups have been fostered such as the Federation of Community Forestry Users, Nepal (FECOFUN) (Fischer, 2017). As such, governance of forests has been crucial to the formation of new political communities capable of representing poor, geographically dispersed peoples (Paudel et al., 2010).

Proponents of REDD+ have recongised the need to safeguard community rights but this rarely happens in practice. In Nepal, REDD+ such as the World Bank, have praised the extent of consultation and

[1] According to a statistical analysis carried out for 135 different societies on five subsistence food sources: agriculture, animal husbandry, hunting, fishing, and gathering, women collected 79% percent of total plant-based food items (Barry and Schlegel 1982 cited in (Howard, 2001).

engagement of stakeholders including FECOFUN in the policy formulation process. However, we have argued elsewhere that stakeholder participation was instrumental with the attempt to legitimize preconceived options (Bushley and Khatri, 2011; Ojha et al., 2013; Khatri et al., 2018a). On the one hand, the involvement of these networks was driven by the desire of proponents to gain legitimacy for the policy process. It was their attempt to counter criticisms that the voices of the most vulnerable communities, i.e. forest reliant smallholders and indigenous people, have not been adequately represented in REDD+. On the other hand, these same stakeholders have been involved in implementation of REDD+ activities. Hence their ability to represent the interests of vulnerable people has been compromised (Khatri et al., 2018a).

As a consequence of these shifts in forest governance and dependence, researchers and advocacy groups have raised concerns that REDD+ will lead to the recentralisation of forest governance and could cause insurmountable damage to people-centred forest management (Khatri et al., 2018; Maraseni et al., 2014). The money that may come from carbon revenues will not be enough to repair this kind of institutional damage. Thus, climate change programs have been shown to have political impacts in the developing world, often creating new power centres and reinforcing the hegemony international interests (Rahman and Giessen, 2016; Leach and Scoones, 2015; Nightingale, 2017).

3. A call for action: restoring multifunctional forestry

It is now high time that forest ecosystems are given due recognition of their services to humanity and the natural world. Reducing forest ecosystems to carbon farming will not help, although carbon could still be one of the many ecosystem services which forests provide. In order to spark a new discussion on multifunctional forestry for building climate resilience, we identify four key strategies. Several socio-technical solutions have been proposed, of which two are noted here. First, a strategy to remove carbon dioxide while burning plant materials has been proposed, now popularised as Bioenergy with Carbon Capture and Storage (BECCS) (Helene, 2018). This strategy is fraught with a number of challenges (Gough et al., 2018) and some even see this as not a carbon neutral option.[2] Second, the concept of nature based solutions, as integrative and systemic solution (Nesshöver et al., 2017), can further enhance the idea of multifunctional forestry, with the need for transdisciplinary research into the design and implementation of solutions based on nature for overcoming a bias towards short-term economic gains and effectiveness. In order to spark a new discussion on multifunctional forestry for building climate resilience, we identify four key strategies.

First, we advocate for transdisciplinary and deliberative research in which researchers collaborate with policy actors, communities, and practitioners to interrogate received wisdom and build new and holistic knowledge to support multifunctional forestry at local and landscape levels. Some practical examples of this approach include critical action research (Ojha et al., 2013) and policy lab methods (Ojha et al., 2014). Such research would, for example, expand current forest monitoring models to include the ecology of not just forest carbon but also the interactions between social and ecological processes underpinning forest management practices (Sexton et al., 2016). This kind of research approach and partnership can help unravel complex ecological and social dynamics surrounding forest management in specific context of governance. A better deliberation over such complex dynamics is crucial for formulating strategies of climate resilience that consider not only carbon, but all the functions and services forest provide.

Second, the need to foster a new and transformational knowledge partnership as mentioned above requires strengthening the national capacity to create and mobilise contextually relevant knowledge. For us, relevance means both pragmatic and problem-solving potential as well as the potential to generate and stimulate critical discourse around dominant policy framings (Dryzek, 2006). This will allow local actors to take charge of the climate resilience planning processes, beyond the current reality in which climate policies and actions of developing countries are driven by international players (Rahman et al., 2016). Developing countries are particularly in need of dedicated research funding that allow critical analysis of the public policy framings through both action oriented and fundamental research, with increased national capacity which can be leveraged through progressive global research partnership.

Third, decentralisation and community rights are important governance reforms (Larson, 2011), but these narratives of forest governance reform are not adequate to handle the planetary issue of forest and climate change. There is now a need to envision a multilevel and multidimensional forest governance system, underpinned by participation and deliberative processes (Stevenson and Dryzek, 2014), with decentralisation and community empowerment being part of the larger deliberative and democratic system. Climate concerns which usually require a longer-term approach beyond immediate interests require constant deliberation (Dryzek, 2010) among political actors operating at multiple levels of governance. Multifunctional forestry also attracts a wider set of stakeholders in a deliberative system, and creates mechanisms of accountable and representative governance crucial to ensure equitable benefit sharing (Ojha, 2008).

Fourth, forest governance must recognise that stakeholder participation is fraught with power (Ojha et al., 2013) and mismatch of knoweledge across scales (Ahlborg and Nightingale, 2012), such that there is a need for more radical and transformational approach to governance (Nightingale, 2017). Skewed power relations inhibit integrated management of forests as ecosystems, and then can trigger risks to their own resilience as well as the roles they can play for mitigating the impact of climate change as a carbon sink. But the underlying power inequality is likely to undermine even the genuinely implemented participatory practices. There is a need to use deliberative and anticipatory learning strategies given the lack of perfect knowledge (Wagner et al., 2014). Further experimentation with deliberative scientific practice (Ojha et al., 2010), one that uses action as a context of collaborative learning and negotiation as way to overcome power imbalances and brings together different knowledges to tackle uncertainty (Ojha, 2013a,b; Tschakert et al., 2016), can be a powerful tool to promote climate resilience.

[2] See Six Problems of BECCS at https://fern.org/BECCSbriefing (accessed 11 January 2019).

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